

What is claimed is:

1. A directional coupler comprising:

- a) a first circuit line having a first end and a second end;
- b) an input port connected to the first end and an output port connected to the second
5 end;
- c) a second circuit line having a third end and a fourth end, the first and second circuit
lines located proximate to each other such that they are electromagnetically
coupled;
- d) a forward coupled port connected to the third end and a reverse coupled port
10 connected to the fourth end;
- e) a first low pass filter connected to the forward coupled port , the first low pass filter
shifting the operating frequency of the directional coupler.

2. The directional coupler according to claim 1, wherein the first low pass filter

15 comprises:

a first inductor connected between the forward coupled port and the third end;

a first resistor having a first and second end, the first end of the first resistor
connected to the forward coupled port;

a second resistor having a third and fourth end, the third end of the second resistor
20 connected to the third end of the second circuit line;

a first capacitor having one end connected to the second end of the first resistor
and the fourth end of the second resistor, the other end of the first capacitor connected

to ground.

3. The directional coupler according to claim 1, wherein the first and second circuit lines have a sinuous shape.

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4. The directional coupler according to claim 1, wherein a third and fourth resistor are connected in parallel between the reverse coupled port and ground.

5. The directional coupler according to claim 1, wherein a second low pass filter is
10 connected to the reverse coupled port.

6. The directional coupler according to claim 5, wherein the second low pass filter comprises:

a second inductor connected between the reverse coupled port and the fourth end;

15 a fifth resistor having a first and second end, the first end of the fifth resistor connected to the reverse coupled port;

a sixth resistor having a third and fourth end, the third end of the sixth resistor connected to the fourth end of the second circuit line;

a second capacitor having one end connected to the second end of the fifth resistor
20 and the fourth end of the sixth resistor, the other end of the second capacitor connected to ground.

7. A directional coupler comprising:

a) a high frequency stripline coupler including a first and second coupled circuit line,
the circuit lines located between a first and second ground plane;

b) a first low pass filter connected to a first end of the second circuit line; and

5 c) a second low pass filter connected to a second end of the second circuit line, the
low pass filters shifting the operating frequency of the directional coupler to a lower
frequency.

8. The directional coupler according to claim 7, wherein the first and second low pass
10 filters have a constant impedance.

9. The directional coupler according to claim 7, wherein the first low pass filter
comprises:

an inductor having a first and second end, the second end of the inductor connected to
15 the second circuit line;

a first resistor having a second and third end, the second end of the resistor connected
to the first end of the inductor;

a second resistor having a fourth and fifth end;

a third resistor having a sixth and seventh end, the fourth and sixth ends of the
20 resistors connected to the second end of the inductor;

a capacitor having an eighth and ninth end, the eighth end of the capacitor connected
to the third, fifth and seventh ends of the resistors, the ninth end of the capacitor

connected to ground.

10. A directional coupler comprising:

- 5 a) a multi-layered substrate, the substrate having an upper surface and a lower surface;
- b) a first circuit line located within the substrate on a first layer and having a first and second end, the first end connected to an input port and the second end connected to an output port;
- c) a second circuit line located within the substrate on a second layer and having a
10 third and fourth end, the fourth end connected to a reverse coupled port;
- d) a first, second, third and fourth terminal located on the lower surface;
- e) a first via extending between the first terminal and the first end;
- f) a second via extending between the second terminal and the second end;
- g) a third via extending between the third terminal and the third end;
- 15 h) a fourth via extending between the fourth terminal and the second end; and
- i) a first low pass filter connected between the third end and a forward coupled port.

11. The directional coupler according to claim 10, wherein the first low pass filter comprises:

a first inductor connected between the forward coupled port and the third end;

a first resistor having a first and second end, the first end of the first resistor

5 connected to the forward coupled port;

a second resistor having a third and fourth end, the third end of the second resistor connected to the third end of the second circuit line;

a first capacitor having one end connected to the second end of the first resistor and the fourth end of the second resistor, the other end of the first capacitor connected
10 to ground.

12. The directional coupler according to claim 10, wherein a second low pass filter is connected between the reverse coupled port and the fourth end.

15 13. The directional coupler according to claim 10, wherein a resistor network is connected between the reverse coupled port and the fourth end.

14. The directional coupler according to claim 10, wherein the first and second circuit lines have a sinuous shape.

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15. The directional coupler according to claim 10, wherein the substrate and the low pass filter are mounted on a printed circuit board.

16. The directional coupler according to claim 15, wherein the printed circuit board has a third circuit line connected to the first terminal and a fourth circuit line connected to the second terminal and a fifth circuit line connected to the low pass filter.

5 17. The directional coupler according to claim 16, wherein the printed circuit board is mounted in a housing.

18. The directional coupler according to claim 17, wherein a first, second and third coaxial connector are mounted to the housing, the first coaxial connector connected to the third circuit line, the second coaxial connector connected to the fourth circuit line
10 and the third coaxial connector connected to the fifth circuit line.

19. A directional coupler comprising:

- a) a printed circuit board, having an input port, an output port and a forward coupled port;
- b) a substrate mounted to the printed circuit board, the substrate having a plurality of layers and an upper surface and a lower surface;
- c) a first and second coupled circuit line located within the substrate on different layers, the first circuit line having a first and second end, the first end connected to the input port and the second end connected to the output port, the second circuit line having a third and fourth end, the fourth end connected to a termination; and
- d) a first low pass filter mounted to the printed circuit board and connected between the third end and the forward coupled port.

20. The directional coupler according to claim 19, wherein the first low pass filter comprises:

- a first inductor connected between the forward coupled port and the third end;
- a first and second resistor connected in parallel across the first inductor;
- a first capacitor connected between the first and second resistors and ground.

21. The directional coupler according to claim 19, wherein the termination is an impedance matching resistor network.

22. The directional coupler according to claim 19, wherein a resistor network is mounted to the printed circuit board and is connected between ground and the fourth end.